

Coastal Plain of Los Angeles Groundwater Basin, Central Subbasin

- Groundwater Basin Number: 4-11.04
- County: Los Angeles
- Surface Area: 177,000 acres (277 square miles)

Basin Boundaries and Hydrology

The Central Subbasin occupies a large portion of the southeastern part of the Coastal Plain of Los Angeles Groundwater Basin. This subbasin is commonly referred to as the “Central Basin” and is bounded on the north by a surface divide called the La Brea high, and on the northeast and east by emergent less permeable Tertiary rocks of the Elysian, Repetto, Merced and Puente Hills. The southeast boundary between Central Basin and Orange County Groundwater Basin roughly follows Coyote Creek, which is a regional drainage province boundary. The southwest boundary is formed by the Newport Inglewood fault system and the associated folded rocks of the Newport Inglewood uplift. The Los Angeles and San Gabriel Rivers drain inland basins and pass across the surface of the Central Basin on their way to the Pacific Ocean. Average precipitation throughout the subbasin ranges from 11 to 13 inches with an average of around 12 inches.

Hydrogeologic Information

Water Bearing Formations

Throughout the Central Basin, groundwater occurs in Holocene and Pleistocene age sediments at relatively shallow depths. The Central Basin is historically divided into forebay and pressure areas. The Los Angeles forebay is located in the northern part of the Central Basin where the Los Angeles River enters the Central Basin through the Los Angeles Narrows from the San Fernando Groundwater Basin. The Montebello forebay extends southward from the Whittier Narrows where the San Gabriel River encounters the Central Basin and is the most important area of recharge in the subbasin. Both forebays have unconfined groundwater conditions and relatively interconnected aquifers that extend up to 1,600 feet deep to provide recharge to the aquifer system of this subbasin (DWR 1961). The Whittier area extends from the Puente Hills south and southwest to the axis of the Santa Fe Springs-Coyote Hills uplift and contains up to 1,000 feet of freshwater-bearing sediments. The Central Basin pressure area is the largest of the four divisions, and contains many aquifers of permeable sands and gravels separated by semi-permeable to impermeable sandy clay to clay, that extend to about 2,200 feet below the surface (DWR 1961). The estimated average specific yield of these sediments is around 18 percent. Throughout much of the subbasin, the aquifers are confined, but areas with semi-permeable aquicludes allow some interaction between the aquifers (DWR 1961).

The main productive freshwater-bearing sediments are contained within Holocene alluvium and the Pleistocene Lakewood and San Pedro Formations (DWR 1961). Throughout most of the subbasin, the near surface Bellflower aquiclude restricts vertical percolation into the Holocene age Gaspar aquifer and other underlying aquifers, and creates local semi-perched groundwater

conditions. The main additional productive aquifers in the subbasin are the Gardena and Gage aquifers within the Lakewood Formation and the Silverado, Lynwood and Sunnyside aquifers within the San Pedro Formation (DWR 1961). Specific yield of deposits in this subbasin range up to 23 percent in the Montebello forebay, 29 percent in the Los Angeles forebay, and 37 percent in the Central Basin pressure area (DWR 1961). Historically, groundwater flow in the Central Basin has been from recharge areas in the northeast part of the subbasin, toward the Pacific Ocean on the southwest. However, pumping has lowered the water level in the Central Basin and water levels in some aquifers are about equal on both sides of the Newport-Inglewood uplift, decreasing subsurface outflow to the West Coast Subbasin (DWR 1961).

There are several principal aquifers/aquicludes present in this subbasin.

Aquifers/ Aquiclude	Age	Formation	Lithology	Maximum Thickness (feet)
Gaspar	Holocene		Coarse sand, gravel	120
Semiperched	Holocene		Sand, gravel	60
Bellflower	Pleistocene	Lakewood Formation	Clay, sandy clay	140
Gardena	Pleistocene	Lakewood Formation	Sand, gravel	160
Gage			Sand	120
Silverado	Lower Pleistocene	San Pedro Formation	Sandy gravel	300
Lynwood			Coarse sand and gravel	150
Sunnyside				350

Restrictive Structures

Many faults, folds and uplifted basement areas affect the water-bearing rocks in the Central Basin. Most of these structures form minor restrictions to groundwater flow in the subbasin. The strongest effect on groundwater occurs along the southwest boundary to the Central Subbasin. The faults and folds of the Newport – Inglewood uplift are partial barriers to movement of groundwater from the Central Basin to the West Coast Basin (DWR 1961). The La Brea high is a system of folded, uplifted and eroded Tertiary basement rocks. Because the San Pedro Formation is eroded from this area, subsurface flow southward from the Hollywood Basin is restricted to the Lakewood formation (DWR 1961). The Whittier Narrows is an eroded gap through the Merced and Puente Hills that provides both surface and subsurface inflow to the Central Basin (DWR 1961). The Rio Hondo, Pico, and Cemetery faults are northeast-trending faults that project into the gap and displace aquifers. The trend of these faults parallels the local groundwater flow and do not act as significant barriers to groundwater flow (DWR 1961).

Recharge Areas

Groundwater enters the Central Basin through surface and subsurface flow and by direct percolation of precipitation, stream flow, and applied water; and replenishes the aquifers dominantly in the forebay areas where permeable sediments are exposed at ground surface (DWR 1961). Natural replenishment of the subbasin's groundwater supply is largely from surface inflow through Whittier Narrows (and some underflow) from the San Gabriel Valley. Percolation into the Los Angeles Forebay Area is restricted due to paving and development of the surface of the forebay. Imported water purchased from Metropolitan Water District and recycled water from Whittier and San Jose Treatment Plants are used for artificial recharge in the Montebello Forebay at the Rio Hondo and San Gabriel River spreading grounds (DWR 1999). Saltwater intrusion is a problem in areas where recent or active river systems have eroded through the Newport Inglewood uplift. A mound of water to form a barrier is formed by injection of water in wells along the Alamos Gap (DWR 1999).

Groundwater Level Trends

Water levels varied over a range of about 25 feet between 1961 and 1977 and have varied through a range of about 5 to 10 feet since 1996. Most water wells show levels in 1999 that are in the upper portion of their recent historical range.

Groundwater Storage

Groundwater Storage Capacity. Total storage capacity of the Central Basin is 13,800,000 (DWR 1961).

Groundwater in Storage.

Groundwater Budget (Type A)

A complete water budget could not be constructed due to the lack of data available. Recharge to the subbasin is accomplished through both natural and artificial recharge. The Watermaster reported natural recharge for the subbasin to be 31,950 af and artificial recharge to be 63,688 af for 1998 (DWR 1999). Additionally, the subbasin receives 27,000 af/yr of water through the Whittier Narrows from the San Gabriel Valley Basin in the form of subsurface flow (SWRB 1952). Urban extractions for the subbasin were 204,335 af in 1998 (DWR 1999).

Groundwater Quality

Characterization. TDS content in the subbasin ranges from 200 to 2,500 mg/l according to data from 293 public supply wells. The average for these 293 wells is 453 mg/l.

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Impairments.

Water Quality in Public Supply Wells

Constituent Group ¹	Number of wells sampled ²	Number of wells with a concentration above an MCL ³
Inorganics – Primary	316	15
Radiological	315	1
Nitrates	315	2
Pesticides	322	0
VOCs and SVOCs	344	43
Inorganics – Secondary	316	113

¹ A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).

² Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.

³ Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

Well Production characteristics

Well yields (gal/min)
Municipal/Irrigation
Total depths (ft)
Domestic
Municipal/Irrigation

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
USGS	Groundwater levels	90
DWR	Groundwater levels	87
Los Angeles County Public Works	Groundwater levels	212 / Bi-monthly
USGS	Miscellaneous water quality	64
Department of Health Services and cooperators	Title 22 water quality	294

Basin Management

Groundwater management:	Central Basin was adjudicated in 1965, and the Department of Water Resources was appointed Watermaster. Every month extractions are reported to the Watermaster by each individual pumper. This allows the Watermaster to regulate the water rights of the subbasin. (DWR 1999)
Water agencies	
Public	City of Bellflower, Bellflower-Somerset MWC, City of Compton, City of Huntington Park, City of Long Beach, City of Los Angeles DWP, City of Montebello, City of Paramount, City of Pico Rivera, City of Santa Fe Springs, Sativa LA County WD, City of Signal Hill, South Montebello ID, City of South Gate, City of Vernon, City of Whittier. (DWR 1999)
Private	California-American Water Company, Montebello Land and Water Company, Bellflower Home Garden Water Co., California Water Service, Lynwood Park MWC, Maywood MWC, Park Water Company, Pearless Water Company, San Gabriel Valley Water Company, Southern California Water Company, Tract No. 180 Water Company, Tract 349 MWC, Western Water Company.(DWR 1999)

References Cited

- California Department of Water Resources (DWR). 1961. Planned Utilization of the Ground Water Basins of the Coastal Plain of Los Angeles County. Bulletin No. 104.
- _____, Southern District. 1999. Watermaster Service in the Central Basin, Los Angeles County, July 1, 1998 – June 30, 1999.
- California State Water Resources Board (SWRB). 1952. Central Basin Investigation. Bulletin No. 8.

Additional References

- United States Geological Survey (USGS). 2000. *Analysis of the Geohydrology and Water-management Issues of the Central and West Basins, Los Angeles County, California*. Internet Web Site: <http://water.wr.usgs.gov/projects00/ca512.html>.
- Water Replenishment District of Southern California. 2000. *Annual Report on Results of Water Quality Monitoring Water Year 1998-1999*.
- _____. 2000. *Engineering Survey and Report*.

Errata

Changes made to the basin description will be noted here.